Bloch modes dressed by evanescent waves and generalized Goos-Hänchen effect in photonic crystals

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It is common knowledge that in an infinite periodic medium, for instance an infinite photonic crystal, the direction of propagation of a monochromatic wavepacket is given by the normal to the isofrequency diagram. We show [1] that this is no longer true in a finite size medium, due to the existence of evanescent waves near the interfaces of the photonic crystal.

In order to understand the consequences of this phenomenon, we introduce the concept of dressed Bloch states. By doing so, we are able to derive a renormalized isofrequency diagram giving the correct direction.

We give a physical interpretation, showing that this phenomenon can be considered as a generalized Goos-Hänchen effect [2-5].

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